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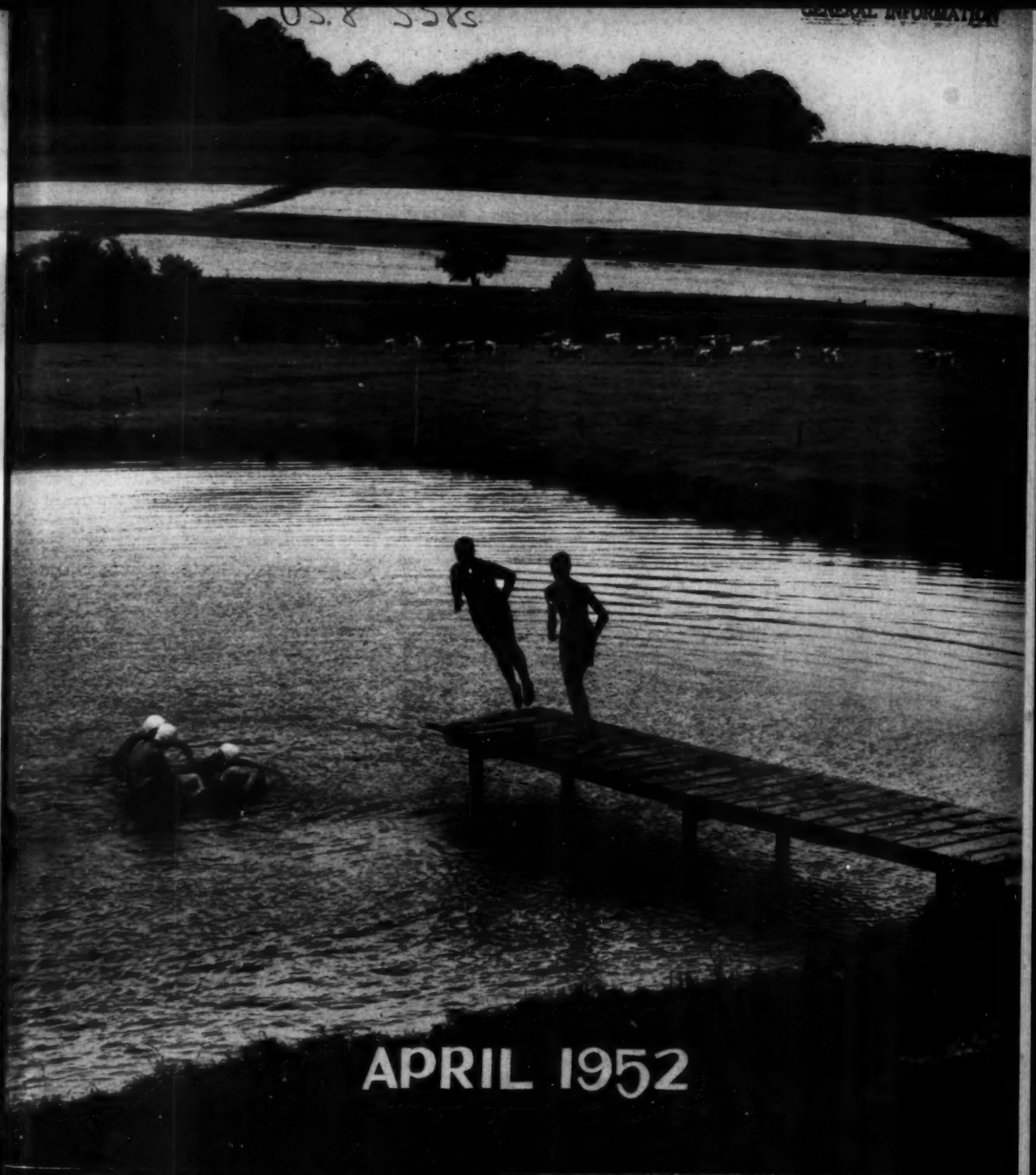

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☆ THIS MONTH ☆

	Page
SOUTHWEST GETS THIRSTIER AS WATER PROBLEM GROWS By Robert V. Boyle	195
MARVIN MELTON OF ARKANSAS — A PROFILE By A. J. Troxell	200
HOW COSTA RICA LEARNED ABOUT CONSERVATION By Charles W. Cleary	202
"TURNIP KING" KEEPS BUILDING SOIL By Henry G. Sauselen, Jr.	205
CONTOURING PERMITS QUALITY CROPS By Hugh F. Eames	207
COUNTY FARM PROSPERS UNDER CONSERVATION By Jerry Kreiger	208
RESCUEGRASS FOR THE SOUTHEAST By B. H. Hendrickson	210
WATER CHANGED THIS FARM	212
A PROMISING GRASS FOR THE WESTERN RANGE By DeWitt C. Grandy	214

WELLINGTON BRINK
Editor
Art Work by
W. HOWARD MARTIN

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, under approval (August 6, 1951) of the Director of the Budget. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

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KEEPS 'EM ON TOES.—Twelve hundred copies of SOIL CONSERVATION Magazine are sent to members every month by the Nebraska Conservation Foundation, Inc. "The information presented is considered the best available to keep the members up to date on conservation and to help maintain their enthusiasm for it."

THE HAWK AND THE HEDGE.—Seeing a hawk chase small birds around his multiflora rose hedge gave Jesse J. Denton, Jr., SCS aid at Flemington, N. J., a new respect for the hedge's conservation value.

Denton planted multiflora seedlings behind his house at Ringoes in 1946. By winter of 1950 they were 6 feet high and thick enough to keep farm animals from getting through. One cold day in January Denton noticed several birds huddled in it, twittering in

(*Continued on page* 201)

FRONT COVER.—This fine pond was built in 1949 as part of the complete soil and water conservation plan of the Ray Shook farm, Curllsville, Pa. The farm is in the Clarion County Soil Conservation District. Shook is a former director, and the first chairman, of the district. His plan includes contoured strips of corn, hay, and grain in rotation; diversions; sod waterways; reforestation. In swimming and skating seasons, this pond is a recreation center for Curllsville youngsters and their elders. It has one-third acre surface. It is fenced off; has seeded banks and a diving dock. This side of the contour strips in background may be seen some of Shook's fine dairy herd. Gordon S. Smith is the photographer.

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SOUTHWEST GETS THIRSTIER AS WATER PROBLEM GROWS

By ROBERT V. BOYLE

It is easy to determine with a soil auger whether or not a field has been properly irrigated.

NEVER before has water been so desperately needed in the Southwest. High prices have led to increased farm acreage and an expanded need for irrigation water. Heightened population of towns and cities has raised the water consumption and further complicated the situation. Military installations, drawn to the Southwest by climate and space advantages, together with quickened mining and other industrial activities, also have built up the demand for water.

Notwithstanding the growing need, water supplies have remained comparatively static. Indeed, in some of the Southwestern States—Arizona and New Mexico particularly—there has actually been a startling decrease in supply. The principal cause is the below-normal precipitation in the form of snow in the high mountains. For nine consecutive years now the runoff caught in the Roosevelt and San Carlos Reservoirs in Arizona has been short of normal, and in some other Southwestern States the reservoirs have been nearly as dry. Groundwater supplies are low in most areas because withdrawals far exceed natural recharge. Pumping from greater and greater depths has resulted from vastly improved pumping equipment and cheaper power, abetted by ever-rising income from crops. Sooner or later, the ground-water supply will be exhausted and it will be mandatory — if not by State law then by natural law — that use be pulled down to balance with the recharge rate.

Some additional water can be brought into water-deficit areas by costly diversion from the Colorado River. While this water has been allocated to the various States of this basin, it has not been fully appropriated and utilized. Agriculture will not get all additional water so provided; increased municipal, military, and industrial needs will take up much of the slack. In fact, municipal and industrial uses have already begun to cut into irrigation-water supplies, and this trend can be expected to become even more pronounced.

So where does that leave the irrigation farmer? Before examining his present position, it might be well to look at where he's been. What has he been accustomed to in the matter of water? There always have been occasional dry years — "short" years — of course. And there are some areas or projects which are always low on water; they never have had enough; they were overdeveloped in the first

Note.—The author is chief of operations, Soil Conservation Service, Albuquerque, N. Mex.

Overirrigation let this valuable water run off field into borrow pit and even onto highway. Proper leveling, careful application, eliminates waste and increases production.

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place — too much land subjugated for the water available. But in many places irrigation farmers have had what water they required. And if they often have been wasteful, they have been so unwittingly.

It is estimated that of the water diverted from streams for irrigation in the western United States, 3 out of 4 acre-feet are wasted. In other words, only 1 acre-foot out of 4 reaches the plant root and is used by plants. Efficiency is therefore about 25 percent. Possibly half of this loss is in transportation, in the canals and ditches between the diversion dam and the farm head gate. The other major waste has been simply through use of too much water on the farm. This has taken many different forms, for example: (1) Making a set in the evening and permitting water to run all night without further attention; (2) use of too small a head on light soils, thus making it necessary to run water a long time to reach the end of the row; (3) use of too big a head with excessive waste at the end of the row or border; (4) use of too long an irrigation run (length of row or border); (5) uneven fields — low places, high places — resulting in flooding the former while trying to irrigate the latter; (6) hiring inexperienced men to handle water.

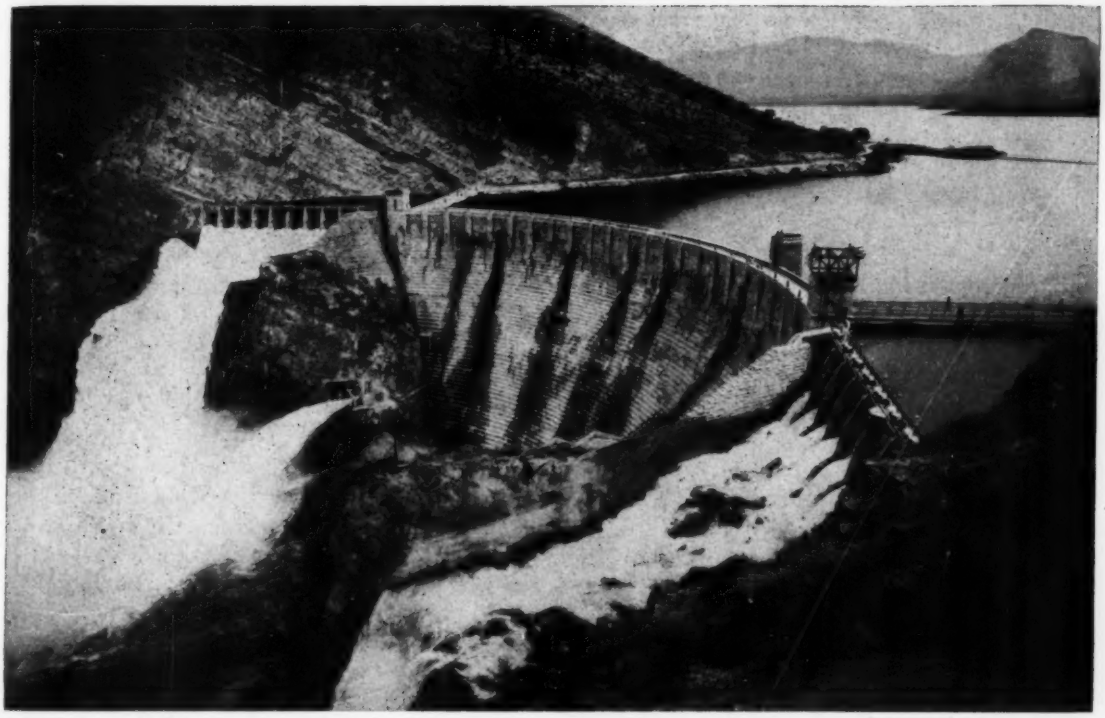
What have been the results of these practices? Well, principally the upper ends of fields, borders, or rows were overirrigated. Water went down far below the root zone. And very often tail water was wasted from the lower part of the field. Overuse of water not only leached plant nutrients from the root zone but very often caused waterlogging of the land being irrigated or of lower-lying fields. How many times have you seen the lanes and roads flooded, at least the borrow pits? Too often, also, the overapplication of water on steep slopes resulted in erosion and loss of good topsoil.

Extravagant irrigation methods didn't pay off. In fact, they sometimes depressed yields. It's well known that in the lower valleys some of the best and largest cotton crops were raised when water was scarce. Now that water-short years are the rule rather than the exception, extravagant application of water is a luxury that farmers can hardly afford.

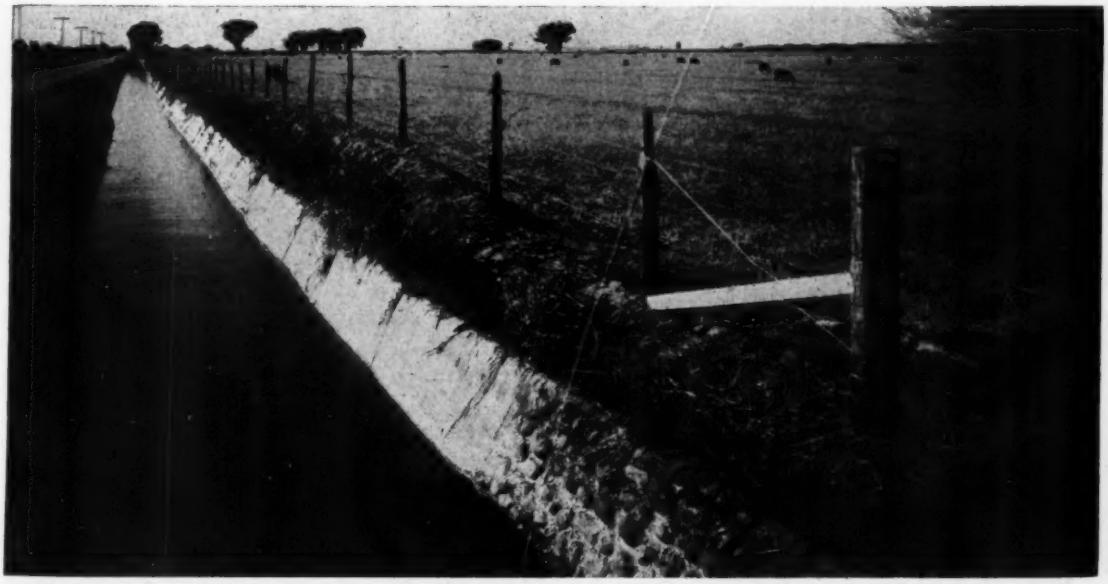
How can we avoid wasting water? Well, there's that canal, mentioned previously, which has a lot of seepage loss. If complete lining can't be financed,

Much water here is lost through seepage and through use by weeds before it gets to the field.

then the worst places — the gravel pockets, for instance — should be located and sealed, and water-consuming willows should be cleared out of the entire ditch. On the distribution systems, the installation of measuring weirs should be considered. Many canal companies use the weirs and insure that each farmer or group of farmers gets a proper share of water. Some people think that water lost from canals is not wasted because it increases the underground flow of water into the streams. There



Arizona has suffered a protracted drought, with consequent shortage of irrigation water. The last time water flowed down the spillways of the Roosevelt Dam on Salt River was in the spring of 1941, when this picture was made.



Lining irrigation ditches helps conserve water. It reduces seepage, prevents pirating of water by weeds and other vegetative intruders.

is no doubt that some of the seepage water does return to the streams further down, but this fact is no comfort to the users who divert enough water into their canal but get only half as much as they need at their farm head gates. Also, a good share of the wasted water is permanently lost to the basin through evaporation and transpiration.

In the fields on the farms, there are a number of things that can be done — that are being done, more and more. Where water is scarce or costly, farm ditch linings should be considered, as well as turn-out structures, drops, and other structures. Ditches may need to be relocated with reference to a new field lay-out, which may involve change in direction and length of irrigation run. And, of course, most fields need leveling.

Now, all these things, when applied, still do not guarantee the best irrigation or a saving in water. They do make good and efficient irrigation possible, however. Here are some pointers which will insure best results:

1. Be sure that crops need water before irrigating. In other words, don't irrigate too often.

2. Don't try to run water so far that it penetrates much deeper at the beginning than at the end of the row; shorten the rows or borders, especially if soils are light.

3. Apply a big enough head to push water through in a hurry, if soils are light. An overnight storage pond may be required. And if soils are heavy, adjust the stream to small enough size to forestall loss at the lower end of field. Spiles or siphon tubes may come in handy for this.

4. Use a moisture probe or shovel to check the depth of penetration, while irrigating and afterward. Don't overirrigate. Shut the water off when the crop root zone has been soaked. Only enough water should be applied to fill up the soil storage reservoir. Experience with the moisture probe or shovel will show when penetration is about right.

Once in a while — probably in the spring when there is ample water from snow melt — it will be advisable to overirrigate in order to flush out accumulated salts. The best way to flush salts out of the root zone is not yet known, but one flushing irrigation a year ordinarily is enough. It should not be attempted where there is tight subsoil and the excess water cannot drain away readily.

Some of the larger irrigation districts employ engineers to give assistance to farmers in ditch

This farmer uses siphons to take water from the supply ditch to the field.

lining, field and ditch lay-out, and land leveling. County agricultural agents also are available for counsel on soil texture and certain related phases of irrigation. Financial help can be obtained from PMA's ACP on many of the practices mentioned. It is only in soil conservation districts, however, that the whole range of technical assistance can be had. These locally governed districts have asked for, and are receiving, the help of State and Federal conservation agencies. Soil Conservation Service technicians are probably most in evidence.

Specifically, the types of help that specialists can give a farmer include advice on soils, either in ditches or fields, and soil and water relationships; on whether or not ditches need lining, and if so, what to use and how much it will cost; on the best kind of permanent ditch and field lay-out—staking for turn-out structures, grade, and field leveling; on water management, which involves the frequency of irrigations, the size of head, the period of irrigation, and how to check on irrigation. First importance is attached to kinds of soil, slope of land, kind of crop, and many other factors. Technicians base their recommendations on research findings, and if a group of farmers wishes, it may arrange for a practical irrigation trial. You'd be surprised at some of the things that are learned during such a trial.

Now, why is all this technical assistance available to farmers in soil conservation districts? Why are Federal agencies assigning trained men to districts? It isn't to help the farmer only. Rather, it is because soil and water conservation is of concern

(*Continued on page* 201)

Scenes like this at Elephant Butte Dam on the Rio Grande haven't been known since 1942, when 4,000 second-feet of water was flowing over the spillway. Continued drought caused water to reach an all-time low in summer of 1951. A record snow pack on Cumbres Pass is bringing hope to valley farmers that the reservoir again may be filled this spring.

Growing population, increased farm acreage, other factors, create greater need for irrigation water. Yet, there is no increase in supply. Only solution appears to be improved efficiency in use of such water as is available. Land leveling, as seen here, is prerequisite to good irrigation; it also increases yields, saves time and labor.

DISTRICT PROFILE | **MARVIN MELTON of ARKANSAS**

Melton loads visual aids into plane before taking off for speaking engagement.

Marvin Melton, of Jonesboro, Ark., is a businessman who likes to farm, fly, and talk soil conservation. He does all three with boundless zest.

Loaded with visual aids to support his talks, Melton flies his own plane to speaking engagements in all parts of Arkansas and in other States too. In Winnipeg, Canada, he told the International Association of Equipment Dealers how they might help to advance soil conservation. He has appeared before groups of implement dealers, bankers, businessmen, beekeepers, farmers, and others in Amarillo, Fargo, New Orleans, Peoria, and Cincinnati.

"I get a lot of personal satisfaction out of giving these talks on conservation," Melton says. "It gives me a good feeling to think that I may be helping to save this land of ours and put it in shape for permanent and maximum production. Aside from direct military security, I know of nothing that's more important for the Nation."

Melton doesn't let lack of airfields handicap him in his flights around the State. Recently he was to address the Young Businessmen's Club at Piggott, where there are no landing facilities. So he landed at Kennett, across the line in Missouri, and officers of the club motored him the 12 miles to his destination.

Melton is much in demand throughout Arkansas. He averages 15 flights a year to make speeches. His talks, while varied to fit local conditions, are generally centered around the fact that conservation farming pays, and pays quickly. He cites figures showing that Arkansas counties where conservation farming is the general rule have increased per capita income over those lagging behind in conservation.

Among Melton's visual aids are 4-foot soil profiles. By large photographs, he depicts damage from erosion, and illustrates the advantages of pastures and cover crops. He chooses his visual aids with care to make them apply to local conditions. And he takes special pains to obtain local information for his talks.

Melton speaks from experience as well as observation. He and his two brothers, Oscar and W. O., are farmers and implement dealers in Jonesboro. Senior member of the firm, Marvin is in charge of the farming interests while his brothers run the implement business. All three are graduates of the University of Arkansas.

In 1944 the Meltons bought an eroded, run-down, 300-acre farm on Crowley Ridge for $16,000. They immediately applied to their Central Crowley Ridge Soil Conservation District for help. W. L. Wilhite, Soil Conservation Service technician in charge of the Jonesboro field headquarters, and his staff were assigned to work with the Meltons in planning and applying a coordinated conservation program for the farm. The Meltons have been district cooperators ever since.

The three brothers did such an excellent job of building up the old farm through their conservation program that in 3 years they were able to sell it for $26,000.

Another year, and they repeated themselves. The Meltons in 1948 bought another eroded, down-at-the-heels ridge farm. On its 260 acres they have done such a good conservation job that production already has paid for the intensive practices required; not only that, but the *value of the farm has been doubled.*

The Meltons are well on their way toward a year-round system of grazing for their fine Hereford cattle. They have excellent fields of Bermuda-grass, Kobe and Korean lespedeza, and white clover for permanent summer pasture, and tall fescue and Ladino clover for permanent winter pasture. Supplemental summer pasture consists of sericea lespedeza, sweet Sudangrass, and annual lespedeza. Ryegrass, crimson clover, button clover, and small grain make up their supplemental winter pastures. Fertilizers are applied every year in accordance with soil analyses.

In addition to their beef production in 1951, the Meltons harvested 18,000 pounds of crimson clover seed, 3,000 pounds of ryegrass seed, 3,000 pounds of tall fescue seed, and 4,000 pounds of sericea lespedeza seed. In 1950 they harvested 12,000 pounds of crimson clover seed which they sold for $6,000.

The Meltons have done such an outstanding job of building up production through their conservation program that numerous tours of the farm are made every year. Claude Cathcart, farmer and PMA county committee chairman, says: "Every time I pass the Melton farm I am reminded of what can be done to this seemingly unproductive Crowley Ridge land through conservation."

The brothers bought still a third hill farm last year; this one, 400 acres. It, too, is getting the conservation treatment. These farming operations are keeping Marvin busy. But not so busy that he can't indulge in his hobby of flying around the country to give talks on the need for and profit from soil conservation.

—A. J. Troxell.

SOUTHWEST GETS THIRSTIER

(*Continued from page* 198)

to the general public—to everyone—and vital to the national welfare.

In the Southwest, water conservation is soil conservation, and vice versa. Where rainfall is scant, soil without irrigation is of little or no value for farming. Therefore, soil and water are inseparable, and conservation of both simultaneously is imperative. In short, if civilization as we know it is to survive in the Southwest, it's going to be necessary to increase the efficiency of our use of water. Overall irrigation efficiency, as pointed out previously, is now about 25 percent. If, by applying water conservation practices, the over-all efficiency could be increased to 50 percent, additional water would be provided the irrigated farms of the West more than equal that expected from all the storage reservoirs now being planned.

THE HAWK AND THE HEDGE

(*Continued from page* 194)

great excitement. A hawk was circling low overhead. As Denton watched, the predator "buzzed" the bushes several times, but the little fellows stayed put.

Evidently angered, the hawk finally tried to crash-land in the hedge. The thicket and thorns halted his plans and forced him to the ground. After walking up and down disgustedly, he flew away, leaving his quarry still well protected by their refuge.

SEE HERE!—Supervisors of the Greene County-Crowley Ridge (Ark.) Soil Conservation District want everyone to know when they're in the district. They have erected clear, easy-to-read signs at the district's boundaries on all roads and highways.

GOOD FARMERS KEEP INFORMED.—A cooperator's sign and a year's subscription to Soil Conservation Magazine are being given to each cooperator in the Macon County (Ill.) Soil Conservation District who made a contribution toward funds needed to operate the district.

The White County (Ill.) Soil Conservation District directors have given a subscription to Soil Conservation Magazine to each of the high schools in the district.

HOW COSTA RICA LEARNED ABOUT CONSERVATION

These contour tobacco beds were built entirely with a shovel, and are cultivated with a shovel and machete.

By CHARLES W. CLEARY

WHEN you reach the top of the divide you can look across Palmares Valley and see it rolled out like a picture with the church towers rising above the trees in the center.

The people who live in the valley make their living from the soil; and the children expect to make their living the same way when they grow up.

From the top of the divide, the valley looks similar to those in the rolling hills of Georgia or southern Tennessee. But this valley is different. It is different because it is on the route of the Pan-American Highway on the northwestern end of the Meseta Central in Costa Rica, Central America.

The Pan-American Highway is nearly finished now and the children will someday play games by counting States of the U.S.A. on the license plates of cars that come through the little town of Palmares on their way to the capital city of San Jose.

Note.—The author is assistant State conservationist in Nevada. He is one of a number of Soil Conservation Service technicians who have taken time out from their jobs at home to help people in foreign countries learn about the United States methods of soil and water conservation. Cleary served in Costa Rica in 1949-50 as soil conservationist on the staff of the Institute of Inter-American Affairs.

Backbone of Costa Rican transportation system: a typical, gaily decorated oxcart used by farmers to move their produce to market.

This valley supports 10,000 people whose staff of life is tobacco. Farms are small. Most of them are operated by the owner and his family with the help of a few peons. Oxen plow the land. The machete and the shovel are the farmer's standard tools. Food crops are short. Rice and beans, the staple foods of Costa Rica, are brought in and the farmers buy them with money received from tobacco. There are not enough vegetables. The once fertile soil has eroded until many tobacco fields are cut by gullies that must be filled every planting season. Raw gray subsoil is in evidence everywhere. Tobacco fields run far up the steep slopes that rim the valley. The farmers have pushed as far as possible looking for new soil—soil that will produce a crop without the chemical fertilizers that have been brought into the valley in increasing amounts in recent years. Forest products are getting scarce. Some of the wood that is burned in the kitchen stoves is hauled from outside the valley. There is not much livestock except the oxen that pull the plows and the oxcarts, because there is not much livestock feed. Meat, milk, and eggs are short items in the local diet.

Here and there in the valley are indications that something new is taking place. Not infrequently there is a tobacco field with the beds running on contour lines. A few fields have hillside ditches across the face of the slope. These carry excess runoff into the stream beds as clear water, leaving the soil in the field where it belongs.

For years no one had been able to grow tomatoes in Palmares Valley. Each season someone would try a few but fungus diseases would strike the tomatoes down before they were ripe. Last year one farmer came home equipped with a small garden sprayer and a few pounds of Bordeaux mixture and planted about half an acre of tomatoes. Tomatoes are very expensive in Costa Rica during

the rainy season when the fugus diseases are worst. This farmer harvested tomatoes from his half acre all during the rainy season. When he checked his records, he found that he had sold enough tomatoes to bring 3,200 colones, or about 400 American dollars.

The corn and tobacco crops are planted, weeded, cultivated, and hilled with the machete and the shovel. To us who are accustomed to tractors and machinery that enable a single operator to handle many acres of planting, weeding, or cultivating in a day, the cost of producing a crop of corn or tobacco in terms of human labor is almost incredible, and it is small wonder that the farms must be small. An acre of tobacco will cost from 50 to 100 man-days of work.

The typical Palmares Valley farmer has a good dependable little horse. But, until very recently, he only used it to ride into town. Now, with just a little help, he has learned how to train his horse to work in harness with a walking cultivator, seeder, or middlebuster. His corn and tobacco crops are planted in contour rows between channel-type terraces and he is cultivating and weeding with the horse. Neighbors watched at first with skepticism and later with mounting interest. The farmer is wondering about getting a little more land. His horse and harness and cultivator opened a new world that had been closed to him before. Yet when I watched him one day, I wondered why such a little thing could mean so much. All that had been necessary was for someone who knew how to do it to come to Palmares Valley for a few hours to help him harness and work his horse.

Farther down the road is a little dairy. It wasn't much of a dairy till a year ago. The cows were potentially fairly good producers with a percentage of good Holstein blood. The trouble was that during the dry season they had very little to eat. The pastures dried up and milk production dropped to almost nothing. In addition, the cattle were plagued with torsalo (cattle grubs) in the wet season and with ticks in the dry season to the point that they were incapable of good production. Last year, with just a little help, the dairyman built a silo and raised a crop of sorghum and corn for silage and started weekly applications of insecticide for torsalo and tick control. Now the dairy produces the year round, the dairyman is prospering, and the people of Palmares have a dependable source of milk.

The Institute of Inter-American Affairs is an organization charged with the task of bringing some of the technical information developed in the United States to Central and South America. The organization has three divisions, Education, Health and Sanitation, and Food Production.

On the basis of a request from the Costa Rican Government the Food Production Division is operating now in Costa Rica. A field party from the Institute and the Costa Rican Government, working together, have formed the Servicio Tecnico Inter-Americano de Cooperacion Agricola known country-wide as STICA. STICA is an agricultural service organization with agents in the important agricultural areas of Costa Rica. The agents are young Costa Ricans, most of them graduates of Costa Rica's school of agriculture. The field party of the Institute, which includes the chief of party, who is also director of STICA, several technicians, and a business manager, brings knowledge and experience from United States agriculture and helps the young Costa Ricans apply it in their country. The program is one of fundamental agricultural needs. Throughout Costa Rica the emphasis is on four major considerations:

1. Conservation and better use of soil and water resources.
2. Control of plant and livestock pests and diseases.
3. Development of the use of agricultural machinery.
4. Development of crops to supply oil, fiber, and livestock concentrates.

Sound soil and water conservation practices constitute the basis of the agricultural development work and STICA workers throughout the country are conscious that any permanent improvement in Costa Rican agriculture must be built on a program that will improve and maintain soil resources.

This may well be due to the fact that the Soil Conservation Service has contributed substantially both in technical information and in personnel to the Food Production Division of the institute. Dillon S. Myer, former assistant chief of the Soil Conservation Service, served for some years as president of the Institute of Inter-American Affairs, and Rey Hill, currently assistant chief of the Food Production Division of the institute, went from the Soil Conservation Service to initiate field work of the Food Production Division in Central

America. Throughout the field work of the Food Production Division are techniques and methods tried out in soil conservation districts in the United States and brought by these men and many others who have gone from the Soil Conservation Service for longer or shorter periods for field assignments in Latin America.

In Palmares, as in many other small towns in Costa Rica, you will find a small office with a yellow and black sign proclaiming — Ministerio de Agricultura e Industrias—STICA—in bold letters. Inside the office you will usually find an earnest young Costa Rican with faith in the future of his country's agriculture and a pride in the organization of which he is a part. At Palmares you will find Carlos Luis Norza, if you come early in the morning before Carlos has gone out to the field.

Don Claudio Volio is Costa Rica's Minister of Agriculture. He is a graduate of a United States agricultural college, and during his college work in the United States he developed a special interest in watershed programs and in the logic of pursuing agricultural improvement work on a watershed basis. Early in 1950 Don Claudio organized a small committee with members from STICA and from the research staff of the Ministry and from the Inter-American Institute of Agricultural Sciences at Turrialba to make a study and develop a program for the improvement of the Palmares Valley which would involve both the application of available information and research work. The committee members first developed an outline of the major problems and needs of the agriculture of the valley and, with this outline as a basis, planned the necessary program to solve these problems. The items of the program were then considered individually and placed in two categories: (a) Those items on which sufficient information already existed to make field work immediately possible, (b) those items on which trials and experimental work must be undertaken before field work would be feasible.

The program as developed is relatively simple and unpretentious — necessarily so because of limitations of personnel and finance. Norza is going forward with his extension work, watching all the while the field trials which are under way on two small experimental farms rented by the Ministry's research agronomist. When the field trials produce enough information for Norza to use in his farm program, he will be there to take it and apply it.

Claudio Volio has a tremendous interest in the work in Palmares Valley because he must have the support of Costa Rican farmers, and he knows that there is no better way to win public support than with a demonstration of rapid progress in a well-known heavily populated area.

The Institute of Inter-American Affairs is vitally interested in the Palmares Valley because it promises to be an excellent demonstration of what an agricultural program can accomplish when backed by the best of cooperative effort.

The Inter-American Institute of Agricultural Sciences, which is the Latin American agricultural research and educational field station for the Pan American Union, is interested in the Palmares Valley because it promises to be a demonstration of what the results of their research program can do when utilized in a well-planned action program.

Norza, in addition to his regular program, is working whenever he has time on a land-capability survey of the valley. He has three distinct types of soils to work with. Each of these major soil divisions is further subdivided according to topography, and within these subdivisions is a further break-down according to climate, as determined by elevation, which affects crop adaptation. When this job is done Norza will have all his land classes delineated, with a summary of adapted crops and crop rotation and necessary soil conservation practices for each class.

When you make that trip down the Pan-American Highway in 1960, watch for the Palmares Valley. It is going to look different then.

REMARKABLE GAINS IN 2 YEARS.—In fields where erosion had slashed gullies 6 inches to 2 feet deep, with great ensuing losses of fertilizer, lime, and seed, John Kimble, West Nottingham farmer in Chester County, Pa., in 2 years increased his tomato yield 100 percent per acre, his oats production 50 percent per acre, and his corn crop 15 bushels per acre.

Contour farming reduced by one-third the time required to handle field work. By operating his equipment on the level, he cut his fuel bill 40 percent; he can do a lot of work in third gear with a three-bottom plow.

Kimble started putting conservation on his land in the spring of 1950. He now has 56 acres in contour strips. Gullies have been sloped and seeded to make 2,250 feet of sod waterways. In the dry years of 1950 and 1951 Kimble noticed that alternate strips of row crops and sod retained moisture.

"TURNIP KING" KEEPS BUILDING SOIL

By HENRY G. SAUSELEN, Jr.

These carrots ran 12 tons to the acre. The team that produced them: Aubrey Watson, Henry G. Sauselen, Jr., and Melvin Watson.

AUBREY WATSON, famed "Turnip King" and intensive truck farmer embraced conservation under duress — 2 years of heavy soil losses by preventable erosion.

In 1939 a roaring north wind swept across his farm in Gloucester County, N. J. It lasted 2 days. It carried away tons of topsoil, and literally blew sweetpotatoes and onions right out of the ground. The next year a severe rainstorm washed away still more topsoil, and in his cropland slashed gullies big enough to bury a tractor.

"We were fast having less and less than the 88 acres recorded in the deed," says Watson.

He had to take quick combative measures, or quit farming altogether. He sent an SOS to all the agricultural agencies in the county. In response the South Jersey Soil Conservation District sent Leo Nocenti, an SCS technician working cooperatively with the district, to look into the worrisome situation.

It took a lot of studying, planning, footwork, and cooperation — but the damage could, and would, be repaired; the disappearance of soil fertility could be stopped and its values restored for top production. A complete conservation plan was required. It would include contour strip cropping and crop rotations. The change would take time, but it could be handled with the use of the Watson farm equipment and would require no extra cash outlay.

With an eye to the time when he hoped to retire from active ownership and operation of the farm, Aubrey Watson turned the job of working with the district and the SCS technicians over to his son Melvin. During the next 2 years, with no more cash outlay than would have been required under old-style operations, the complete conservation plan was established. And in 1949, just as Aubrey had

Note.—The author is work unit leader, Soil Conservation Service, Woodbury, N. J.

Air view of Melvin Watson farm. The light strips had just been seeded to turnips for spring production; onions grew there much earlier. The medium light strips were in alfalfa. The dark bands were carrots.

foreseen, Melvin took over as owner and operator with a well-rounded background of experience in farming "on the level."

When spring came in 1951, County Agent George Lamb arranged a field-day demonstration at the farm so that others could see just what had been accomplished under conservation. Broadly smiling Melvin and his happy dad greeted the visitors. Erosion had stopped almost as soon as the soil-protective measures were established, Melvin told them, but it was 3 years before he began to notice sustained improvement in yields or an improved condition of soil. "Years of ravishing are not overcome in a jiffy," he ruefully noted.

Melvin Watson kept careful records. He is getting 300 to 500 bushels of turnips per acre in fields where only 250 bushels were produced 10 years ago. At current prices, that is a gain in income of $525 to $875 per acre.

The increased production enables Melvin to market 6,500 bushels of turnips annually at Cleveland, Pittsburgh, Baltimore, and Washington. Half is from his farm; the remainder by purchase from other growers. He is keeping the "Turnip King" crown in the family.

In carrots, a new crop at the farm, the yield is among the highest delivered to the canning company. It is about 3 or 4 tons per acre more than the average production by others, even in a dry season. The local average is about 9 tons per acre, but Melvin is digging 12. At current prices, this is equal to about $60 to $80 more revenue per acre.

All of Melvin's cropland is in contour strips. Alfalfa and vegetables are in alternating strips. After carrots, onions, and turnips are harvested, there is a good cover crop on the land to guard against erosion. The alfalfa hay — 4 to 5 tons per acre now, as against only 2 tons per acre 10 years ago — is sold to a nearby dairyman. At current prices it means a gain of $90 to $135 income per acre.

Last year Melvin had 25 acres of carrots, 15 of onions, 10 of radishes, 7 of spring turnips, 5 of pumpkins, and 18 of alfalfa. There are 3 acres in the farm wood lot. Under the woodland improvement program in Watkins' complete conservation plan, Glenn Smith, SCS technician, has marked 43 trees for selective cutting. These black and white oak and tulip poplar trees will produce 15,620 board feet of lumber, log rule. Fifteen years after this cutting is made, the tract, permanently in woods, will be ready to yield another selective crop.

Melvin uses 5 acres as range for turkeys. Aubrey started this side line with 50 birds before he became a conservation farmer. With the aid of his contour strips, Melvin has increased the annual carrying capacity to 2,000 turkeys. He raised 1,200 in 1951.

The soil of the Watson farm now has improved moisture-holding capacity. Land that formerly could not be worked until late in spring now benefits from better drainage. Plowing and planting once were held up by wet spots in square fields. Now, each spring, Melvin starts at the topmost strip and progressively works over his fields to the lower parts, without loss of time. "It's better to farm curved rows than to haul dirt to fill gullies, and we've done both. Sure, it took a little extra

time and care at the start, but now we wouldn't farm without contour strips," say the Watsons.

Control of erosion and improved water-holding capacity were emphasized at the farm in 1951. With rainfall well below normal, Melvin still had bumper yields of carrots, onions, and turnips of high quality; other farmers not in conservation farming had lessened yields and poorer quality. Part of his good results, Melvin says, were properly attributable to improved moisture-holding capacity, and part to lime, fertilizer, and improved seed varieties. Lime and fertilizer get in their good licks because they are not washed away before they can get their job done, Melvin explains.

Annual soil tests determine the kind and amount of fertilizer and lime needed in each field. Every year they reveal that the organic content is mounting higher and higher.

"It's fun to work with this soil now," Melvin remarks. "If Dad hadn't got us turned around and started in the right direction, we just wouldn't be farming here now, because the rains and winds would have washed and blown the place away."

Melvin keeps improving his operations. This season, for example, he bought a two-bottom rollover plow that is ideal for work in contour strips. It helps improve moisture-holding capacities by throwing all furrows one way. This eliminates the low-producing dead furrow that is often such a problem.

The example set by the Watsons and the outstanding results that they have obtained from conservation farming have not escaped the notice of other farmers. Many in Gloucester County have followed their lead. There's Robert Hemphill, for example. Hemphill, whose vegetable farm slopes were short, steep, and considerably eroded, asked the district for a complete conservation plan tailored to his acres and operations, on the basis of over-the-fence observations of his neighbor's farm.

CONTOURING PERMITS QUALITY CROPS

By HUGH F. EAMES

CONTOURING has proved its value on 20 formerly depreciating acres farmed by Burdette Farnham near East Hartford, Conn.

The land once was continuously in tobacco. It had been cropped steadily for well over half a century. It was losing organic content steadily notwithstanding the disking-in of cover crops.

In an effort to add needed organic matter, Farnham tried to make use of peat (testing 85 percent organic matter) from his nearby bog. But the power shovel became mired and had to be hauled out.

In 1938's "big hurricane" days, this field, in fact most of the farm, was under the floodwaters of the Connecticut River. Farnham had read a lot about conservation farming and was keenly interested in the possibility of contouring. A few years ago, without the help of any agency, he laid out contour lines on the 20 acres and began to farm horizontally. Now he wouldn't farm any other way.

Burdette Farnham cultivating tomatoes in 20-acre contoured field.

The soil is so "early" that Farnham usually starts working it in March, or early April at the latest. He has his vegetables on the market before most farmers in that area think about harvesting.

Note.—The author is with the current information division, Soil Conservation Service, Upper Darby, Pa.

He grows 3 acres of tomatoes, and 17 acres of celery, cauliflower, cabbage, iceberg lettuce, peppers, and eggplant. Because the acreage is limited, he aims for high quality, specializing in fancy products that bring top prices.

An incredible amount of labor is involved, but it pays off. Take contoured tomatoes, for example: Staking the rows and building the wire and twine trellises require a lot of labor, but the twice-a-week cultivation and spraying are done much easier and at less cost; there is less spoilage and more yield.

When picking starts in July there may be only 2 or 3 baskets harvested daily. Through the entire season, however, the average daily harvest will be about 100 baskets. Last year 7,000 half-bushel baskets of tomatoes were produced on the 3 acres. At the peak 450 baskets per day are harvested. Farnham picks the fruit until the prices get down to about $1.50 per basket. Then he invites outsiders to bring their containers and pick what they want for 50 cents per basket. This works out well, except that the rush of pickers causes traffic problems.

The old deep gullies have disappeared from this field. Contouring keeps soil and fertilizer in place and lets the soil soak up and store excess rainfall for later use. Contour rows permit Farnham to irrigate steadily for 1 hour. This supplies enough water for one application, and every drop of it sinks into the soil.

If the rows ran up and down the hill, after about 15 minutes of application the water would be running off the field, before the soil had received the water that it needed. Then Farnham would have to stop for about 15 minutes before he could irrigate again. It would be a continuous process like this unless he moved the pipes more often. By either of these methods, both water and labor would be wasted.

Farnham removes the tomato trellises at the end of each season and puts them back at the start of the next — always on contour. Of course, building the trellises in straight rows would be easier, but experience has proved to him that this is not the way to handle sloping land. In contour operations, this farmer points out, use of equipment is not difficult. He uses a small tractor for cultivating and spraying, and larger equipment for plowing and harrowing.

"Few other contour operations are so complicated as staked and trellised tomatoes," Farnham notes. "But I have found that contouring pays, and I like it. Any other farmer with a similar setup can get the same excellent results."

COUNTY FARM PROSPERS UNDER CONSERVATION

By JERRY KREIGER

THE old title of "poor farm" doesn't apply in Berrien County, Mich., any more.

Under a soil conservation plan started on the farm 2 years ago, the county farm has changed from a red-ink proposition to a profit maker.

Where 1 ton to 1½ tons of hay, and 40 or 50 bushels of corn, came off an acre before the plan was started, now 2½ tons of first-cutting hay and nearly 100 bushels of corn are the yields.

From a problem of buying 3,000 bushels of corn and 50 tons of hay from the outside each year to carry, roughly, 75 head of beef and dairy cattle, the farm will produce more than enough hay and corn for over 100 head of cattle this year. It also will supply all the feed for 150 hogs.

The county taxpayers won't have to buy any meat from the outside to fill the meat needs at the county hospital and infirmary this year. And the number of patients is now greater than it has ever been before.

Except for potatoes and a few specialty diet items such as head lettuce, the county farm will provide all the beef, pork, milk, butter, eggs, poultry, and summer vegetables required for the hospi-

Note.—The author is farm editor, *The News Palladium*, Benton Harbor, Mich.

Dairy herd in Sudan pasture.

tal and infirmary. And as quickly as the soil is built up enough through a program of fertilizing, liming, and legume crops, the farm will also keep the potato bins filled.

Last year, only the second year of the program, the farm showed a net profit of $9,000, after depreciation and all other charges were deducted. Produce from the farm is "sold" to the hospital and infirmary, and prevailing market rates figured to show the farm's earnings.

Before the soil conservation grassland farming program was started, the farm was doing well if it broke even, according to Harry Hogue, Eau Claire, a member of the Berrien County Welfare Board, which supervises the farm.

About 3 years ago the board decided something drastic had to be done to put the farm back on its feet. Its soil had been "mined" so long that alfalfa wouldn't grow anywhere on it, and on some places clover wouldn't even grow. Its Junegrass pastures wouldn't carry the livestock to the middle of summer and its grain yields wouldn't last to winter.

The board called in for advice James E. McKittrick of the Soil Conservation Service, cooperating with the St. Joe River Soil Conservation District, and County Agent J. D. Johnson.

The result was a complete soil conservation farm program for all 433 acres.

Gail Peapples, a progressive young farmer, was brought in as farm manager. Following the plan strictly, Peapples has brought about a complete transformation.

He has poured some 450 tons of lime into the soil in 3 years, and he has been liberal with the fertilizer. This year he's used 44 tons of commercial fertilizer, in addition to some 500 tons of manure produced on the farm.

There are no more Junegrass pastures. The stock grazes on lush stands of alfalfa-bromegrass and clover, plus some Sudangrass for temporary pasture.

Under the soil plan, the level land is in a 4-year rotation of corn, oats, clover, and wheat. The rougher and hilly land is in a 6-year rotation of corn, oats, and 4 years of alfalfa-brome. All grain crops are seeded with legume cover crops. The farm, which actually is divided into two separate tracts about 5 miles apart, is about equally divided between level and rough land.

Despite the big transformation of the farm, Peapples notes that this is only the third year and that even more improvement lies ahead.

Rescuegrass ready to be combined for seed at soil conservation nursery, Chapel Hill, N. C.

RESCUEGRASS FOR THE SOUTHEAST

By B. H. HENDRICKSON

OVER a century ago, a Mr. Iverson of Columbus, Ga., tried to interest other Georgians in a grass that he named rescue, because it started growth in the fall after summer grasses became tough and wiry. In his pasture rescuegrass provided some winter grazing, went to seed in late spring, reseeded itself, and maintained itself.

That was long before the day of commercial fertilizer. And since this grass likes good land, and will not grow well on poor soil, Iverson's efforts brought little or no response. The grass never became popular, and it seems to have been forgotten or overlooked for about 100 years. The scientific name for rescuegrass—a brome—is *Bromus catharticus.*

About 10 years ago, the Soil Conservation Service made observational plantings of this grass at some of its nurseries. The plants were well fertilized. Results were so outstanding that seed was harvested and distributed to soil conservation districts for observational plantings on farms. Here the grass was confronted by a variety of conditions. Several farmers sowed seed on kudzu in the fall. Results were good.

In the fall of 1948, we planted rescuegrass on old stands of kudzu that were grazed down in the fall. We got only a thin stand the first year, but the grass thickened to a full stand the second fall. It was about 6 inches high and ready to be grazed by the first of November.

Since then we have had both kudzu and rescuegrass for grazing from July through October. Many of the old rescuegrass plants lived through the summer in the partial shade of the kudzu. From November until mid-April we had rescuegrass grazing while kudzu was dormant. We closed the pasture from mid-April to about the middle of the summer to let the kudzu stand recover.

We still need a lot of information about this plant combination. We already know that the grass, which is a short-lived perennial in north Georgia and usually a reseeding annual in the

Note.—The author is project supervisor, Southern Piedmont Conservation Experiment Station, Soil Conservation Service, Watkinsville, Ga.

Coastal Plain, will survive in a stand of kudzu that is grazed in the fall. We know that rescuegrass is palatable and that stock like it. And like the other bromegrasses, it is nutritious.

We still lack sufficient knowledge on how to manage kudzu in combination with rescuegrass, and on what fertilizer treatment to use and when to apply it. It is common practice to fertilize in the fall to stimulate the growth of winter grass. Grass that grows in winter draws rather heavily on mineral nutrients that are essential to the satisfactory growth of kudzu. Will liberal fall applications of fertilizer take care of the needs of both cool-season grass and warm-season legume? Or must we fertilize in the spring for the legume?

We also need to know more about grazing management. The vigorous growth of grass that we've been getting in the winter was due to the effect of the kudzu. We don't want to graze the kudzu out and thus effect a double damage.

Our experience shows that this definitely is not a year-round pasture. Where we grazed kudzu in the spring or overgrazed it in the summer, ragweed came in and required summer mowing. It is possible that more liberal fertilization would have increased the vigor of kudzu plants to such an extent that grazing would have been less damaging. We are planning further study of the management of these two plants.

Rescuegrass grows with other plants than kudzu. It has grown in combination with sericea in much the same way as with kudzu. It has grown in mixtures with reseeding crimson clover and other annual winter legumes. And it has grown successfully with alfalfa and Ladino clover.

What is rescuegrass like? It grows in tufts and is leafy at the base. It looks a good deal like oats. It grows 2 to 3 feet tall and has slender seed stalks that often bend down under the weight of the seeds. Seed heads resemble oats, except that they have a flattened appearance. Seeds are nearly as large as oats, but weigh only about half as much per bushel. The grass is a heavy seed producer, and in 1951 we harvested two seed crops on the same land—the first late in May and the second in July.

Mildew and smut are the most common diseases, and they are serious on most strains. The strain from Soil Conservation Service nurseries has been one of the better kinds at Watkinsville. It certainly was one of those most nearly free from disease.

Rescuegrass with clover.

Rescuegrass may be sown on kudzu in the fall and pushed into the soil by the feet of grazing animals. It can be established in this manner even on rough, gullied land. About 25 pounds of seed per acre has given good stands. Somewhat lighter rates are sometimes sown on kudzu by farmers to get enough plants the first year for a light seed crop from which a thick volunteer stand comes the following fall. When seed becomes more plentiful, the heavier rate of seeding probably will be more common.

We have disked down kudzu in the fall and drilled the grass seed. Severe fall disking of kudzu may result in injury from cold. Kudzu will stand more disking in the spring than it will in the fall.

Rescuegrass seed is very light. We have mixed about 5 pounds of grass seed with each 100 pounds of complete fertilizer of 4-8-6 analysis and drilled 500 pounds per acre, with the drill set for 600 pounds. We planted immediately after mixing so as to avoid seed injury. In the spring the grass was top-dressed with 100 pounds per acre of ammonium nitrate.

We have harvested as much as 500 to 800 pounds of rescuegrass seed per acre the year following fall seeding. These plantings were made on good seedbeds on cropland that was in moderately productive condition.

Within a few years there should be ample supplies of seed available from healthy strains, as rescuegrass is a prolific producer of seed of good quality.

WATER CHANGED THIS FARM

WILLIAM JACOBS runs a Grade A dairy and is a member of the Golden Guernsey Club. Two deep wells and a carefully managed irrigated pasture are largely responsible. Biggest factors, of course, are the Santa Rosa Soil Conservation District and the SCS techniques.

Jacobs did not prosper as a dry-land farmer in Sonoma County, Calif. His cows suffered for want of green forage in spring and fall. They hardly more than paid their keep. Jacobs did well to run a Grade B dairy in 1944.

Today the contrast is almost unbelievable. Jacobs' pastures are green and lush. His cows have green forage from mid-March to mid-November. Water helped Jacobs win the California award of merit for all-around dairying. His cows average more than 400 pounds of butterfat. Golden Guernsey milk brings better profits, too.

Mr. and Mrs. Jacobs, Marylin, and James in tall fescue pasture.

Golden Guernseys of Jacobs herd, back-high in pasture of tall fescue, birdsfoot trefoil, and Ladino clover.

Jacobs worked for wages on the 270-acre dry-land farm before buying it in 1943. As owner, he put into action a good many ideas he developed as a hired hand.

A bit of sudden and unexpected good fortune started him on conservation planning; he tapped a supposedly dry well! The well which people had thought to be dry for a quarter century gushed forth enough water to irrigate 36 acres.

He began putting in new pastures before he used a drop of the well water. He plowed and disked 26 acres of the old dry land. Then he let the chopped sod rot for a month. Then came two more diskings just before seeding. Jacobs first drilled in 15 pounds of Sudangrass, as a nurse and quick-hay crop. Next day he seeded the rest of the mixture, which included 4 pounds of big trefoil, 1 pound of Ladino clover, and 3 pounds of alfalfa per acre. He followed up by smoothing the ground and irrigating.

Jacobs made good use of his well water. He began using sprinkler irrigation, a system which is fast growing in favor in the Santa Rosa Soil Conservation District. Water was applied at the rate of 3 inches every 14 days after cutting the hay in May.

He has worked out a pattern for sprinkling which saves time and labor. He moves his sprinkler line 80 feet instead of the usual 40 to 60 feet. He gets good water coverage by staggering the outlets every 40 feet.

Volunteer hay crop of ryegrass, vetch, and oats being cut on William Jacobs farm. This crop averaged 2 tons per acre.

Last summer, with two wells, this Bennett Valley dairyman irrigated 50 acres of good forage. He will soon have another 50 acres ready for watering. Eight irrigated fields are in his rotation grazing plan. His dry-land pasture is divided into 10 fields.

Jacobs feeds very little hay from June to November, while his 70 cows are on the irrigated land. He also cuts down on dairy feeds. From November to February the cows are in open feed lots and feed barns, where they get half a ton of hay daily and 12 pounds of dairy feed per cow. Last year he fed 30 tons of purchased hay along with the hay he cut for winter feeding. The cows are on dry-land pasture from February to June.

Each fall Jacobs put on 300 to 500 pounds of complete commercial fertilizer per acre. He stopped using barnyard manure because, he says, it sows too many weeds in his fields.

Jacobs' income has climbed along with his herd's good butterfat record. Most of his profits have gone back into building a Grade A dairy. He buys good breeding stock and uses only the foremost Guernsey bloodline. Not long ago he proudly nailed a Golden Guernsey Club sign on his barn door.

He expects his cows to beat the 400-pound butterfat average his herd made last year. In 1950 the top cow of his herd, a 16-year-old, produced 648 pounds. She turned out 705 pounds the year before. Two of his cows are doing better than 500 pounds of butterfat.

Now that Jacobs' irrigated pastures are producing so well, he has branched out into beef production. Not long ago he bought 320 acres of adjoining dry land which he will use as pasture for his beef herd — but that is another story.

EFFECTIVE DEMONSTRATION.—Conservation of soil and water is everybody's business. It's the kind of business which is taken seriously by the Nebraska Conservation Foundation, Inc. The foundation, which is broad enough to include State leaders in industry, was organized by the Bankers Association 2 years ago.

In 1951 the foundation had one of the most outstanding and popular agricultural exhibits at the State Fair at Lincoln.

A map showed the location of acid soils in the State. Large photographs told the need for soil testing, revealed the results of corn grown under different crop rotations and varying amounts of organic or commercial fertilizer. An interesting feature was a plant-testing demonstration.

An article on the Nebraska Conservation Foundation, Inc., appeared in our issue for February 1950.

Dick Donahoe conducts demonstration of plant testing at Nebraska State Fair.

Intermediate wheatgrass planted on 3.2 acres on Bennett Lindsay farm, near Heber, Utah, in 1950, last year produced seed valued at $2,025 plus 220 bales of highly palatable straw for livestock consumption. Here is part of the planting.

A PROMISING GRASS FOR THE WESTERN RANGE

By DeWITT C. GRANDY

BENNETT LINDSAY is an ardent supporter of the theory that good land use and grassland farming go hand in hand. He finds that grass is a profitable cash crop whether grown for seed production or for harvesting by livestock.

Lindsay, who farms with his three sons near Heber, Utah, was the first to plant intermediate wheatgrass in the Wasatch Soil Conservation District, of which he is vice chairman of the board of supervisors.

A trial quantity of intermediate wheatgrass seed which Lindsay obtained from the Soil Conservation Service was drilled in rows 30 inches apart on 3.2 acres of clean-tilled land in the spring of 1950. The seedbed was firm and slightly moist at the time of drilling.

Since irrigation water is rather scarce in the Heber area, the grass planting was not irrigated the first year. During the summer of 1950, some annual weeds appeared and the area was sprayed with 2-4D in preference to cultivating between the rows.

Ben Lindsay, a son, observed that the grass looked rather lonesome during the first summer in rows 30 inches apart. This proved to be a distinct advantage, for the next year the individual grass clumps grew as large as 18 inches in diameter.

During the second year the grass planting was irrigated only once, the water being turned on around July 15. In 1951, apparently because of its vigorous nature, the intermediate wheat grass seemed to control the weeds, making it unnecessary to spray or cultivate.

When about a third of the seed heads had ripened in 1951, Lindsay cut the wheatgrass with a binder. The bundles were shocked and allowed to dry for about 3 weeks. Then they were threshed with a combine harvester, the straw being baled. The basal leaves of the grass were green at the time of harvest, so 220 bales of high-grade straw were obtained. This was highly palatable and was readily eaten by range livestock.

After recleaning, 1,446 pounds of seed were harvested, or 452 pounds to the acre. During the

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Note.—The author is soil conservationist, Soil Conservation Service, Heber, Utah.

summer of 1951, commercial concerns in Utah were selling intermediate wheatgrass seed for around $1.40 per pound, which made Lindsay's seed crop worth about $2,025, or $632.80 per acre.

It now appears that intermediate wheatgrass has a promising future in Utah and other western range States. In the Wasatch Soil Conservation District, several farmers now are planting this grass with alfalfa in the place of smooth bromegrass. The stiffer stems of intermediate wheatgrass seem to hold up heavy crops of alfalfa and keep it from lodging. Recovery after the first cutting also appears to be better than in the case of smooth bromegrass. Because of its drought-resistant qualities, the wheatgrass can be planted where irrigation water is uncertain or limited, and still reach heights of 4 to 5 feet.

Where rainfall is in excess of 15 inches and soils are of medium depth, intermediate wheatgrass has done well in Wasatch County on sagebrush, oak, and aspen sites. This grass may replace smooth brome plantings in the aspen sites because of its excellent seeding, vigor, and ability to produce well on soils that are low in plant nutrients.

LEVELING SHALLOW SOILS.—The new leveling method, worked out by technicians of the Corning, Calif., headquarters of the Soil Conservation Service, makes land leveling simpler and cheaper. Already the plan has cut earth-moving work on some farms as much as 70 percent.

A good share of the more than 6,500 leveled acres near Corning is benchland above the Sacramento flood plain. Some of the shallow backland benches slope as much as 20 percent and are underlain with hard subsoil. Very little moisture gets past the topsoil. Roots have a tough time growing, and, consequently, crop production is poor on the shallow benches.

Many dry-land farmers, with grain crops of 5 to 10 bushels per acre, consider leveling the best way to make their lands pay. Swinging over to irrigation is giving them a new lease on life. Irrigated pastures on these soils are productive and profitable.

But farmers often shy at leveling shallow soils. If they cut too deep, they're in hardpan. If they don't cut deep enough, they're still in trouble—water won't run evenly. The "mean leveling plan" is made to order for owners of shallow soils.

Take, for example, a piece of hummocky, sloping land. Most farmers skim off a layer of soil clear across the field. On shallow soils they end up with a field of bald, barren spots.

Under the new method, they don't hit hardpan because they're working only with the shallow topsoil. Several benches may result before they're through making all the cuts and fills. These benches will not interfere with watering because they are all properly graded. The important thing is that the topsoil remains on top.

Mrs. Hazel Falls, who farms in the El Camino community near Corning, planned to move about 5,200 cubic yards of earth to grade 10 hummocky acres the conventional way. SCS technicians showed her that the leveling job could be cut to 1,750 cubic yards by leveling to three natural benches in the field.

Today Mrs. Falls says she is glad she followed the recommendation. Bench leveling cut the cost of the job to one-third the early estimate.

PEANUTS UNDER DROUGHT CONDITIONS.—G. G. Goss of Rising Star, Tex., raised a peanut crop on little more than an inch of rain.

Goss is a supervisor of the Brown-Mills Soil Conservation District. His soil is in good physical condition, as befits a veteran conservation farmer. It is well-loaded with organic matter. Evaporation is low. His peanuts therefore made full use of what scant rain actually fell: 75/100 inch July 1, 9 days after planting; 3/10 inch August 11; and 25/100 inch four times in September—too late to do much good. But Goss made more than 10 bushels per acre.

Peanut crops in the same area failed on farms that had not been under conservation 2 years or longer.

Goss uses a rotation of soil-improving rye and vetch with his peanuts. He wind-strips his peanut land with maize interplanted with summer peas. He leaves the maize stubble and peanut hay as protection against wind erosion.

Goss with peanuts.

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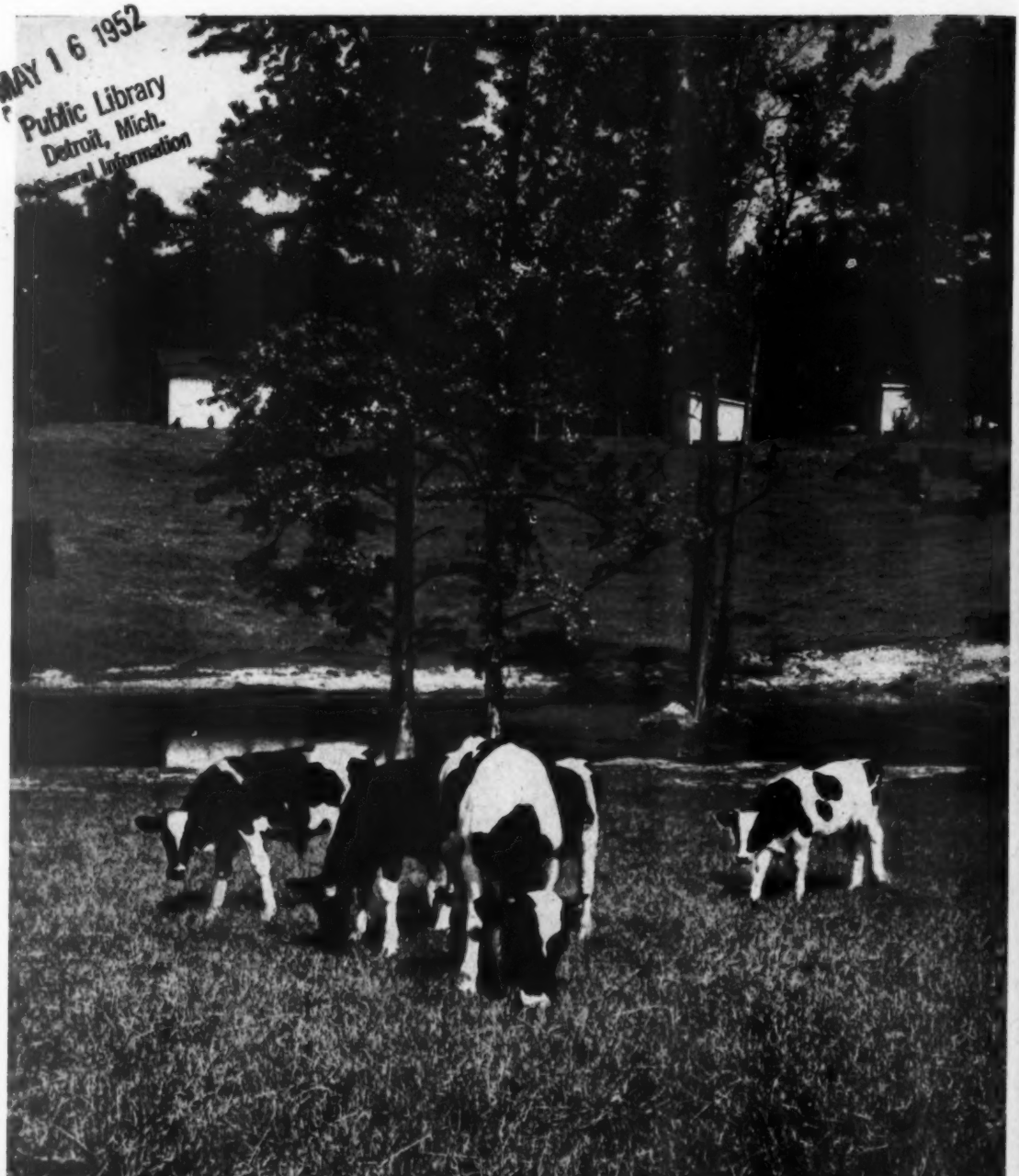

These Holstein yearling steers are grazing on one of the great plants of the modern conservation era, a plant variously known as tall fescue, Kentucky 31, and Festuca elatior arundinacea. *Seeded in October and clipped in June, just before this picture was taken, the field is in the farm of G. S. Evans, near Irwin, Va. Photographer: Hermann Postlethwaite.*

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